Gas connection block

The machine can be equipped with a Dräger gas connection block or a FAS gas connection block.

The connector plate of the compressed-gas connections has either four fixing screws (Dräger gas connection block) or two fixing screws (FAS gas connection block):

1 Dräger gas connection block

2 FAS gas connection block

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1 Dräger gas connection block

The connector plate of the Dräger gas connection block is secured to the back of the machine by four screws (Allen screws, SW3).

To the items:

1.1 Replacing the filters and the flat seal

1.2 Removing the Dräger gas connection block

1.3 Replacing the pressure regulators

1.4 Adjusting the pressure regulators

1.5 Fitting the Dräger gas connection block

1.1 Replacing the filters and the flat seal

1 Switch off the machine.

2 Unplug the power plug of the machine from the socket-outlet.

3 Disconnect the compressed-gas connectors of the machine from the compressed-gas supply.

4 Unscrew the compressed-gas hoses from the machine.

5 Remove screws and washers (Fig. 1/1) and remove the connector plate.

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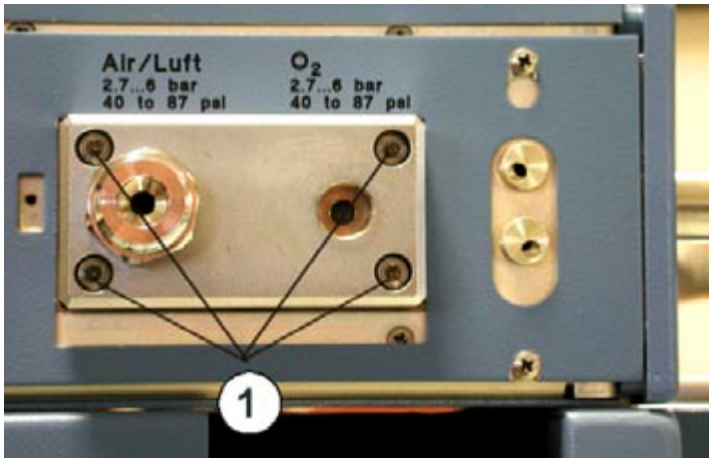

Fig. 1 Rear view of the machine

6 Remove old flat seal (Fig. 2/1) from the connector plate and dispose of it according to local waste disposal regulations.

7 Remove old filters (Fig. 2/2) and dispose of them according to local waste disposal regulations.

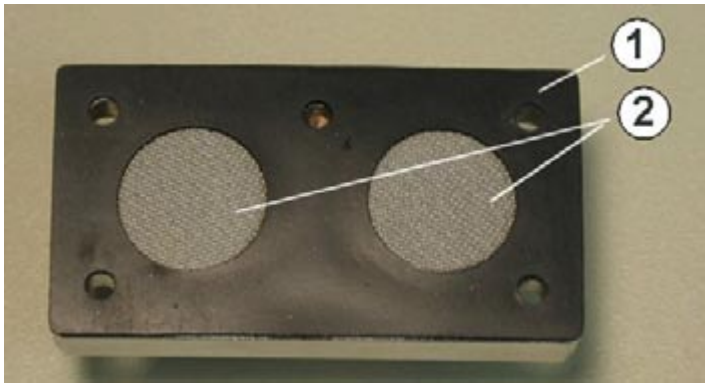

Fig. 2 Connector plate with flat seal and filters

8 Fit new filters into the connector plate, making sure the position is correct, see Fig. 3 (Note: The fine filter points towards the compressed-gas connection).

Fig. 3 Rear view of the connector plate, filters

9 Fit new flat seal (Fig. 4) in the Dräger gas connection block, making sure the position is correct.

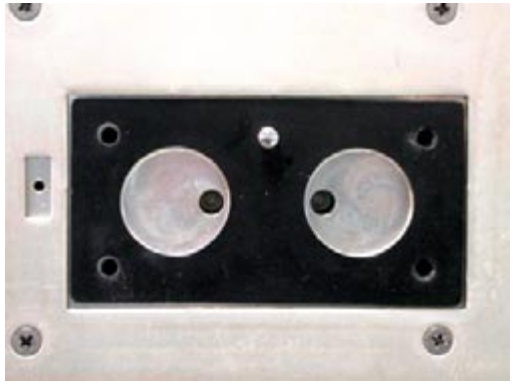

Fig. 4 Rear view of the Dräger gas connection block, flat seal

10 Secure the connector plate to the Dräger gas connection block using the screws and washers (Fig. 5/1).

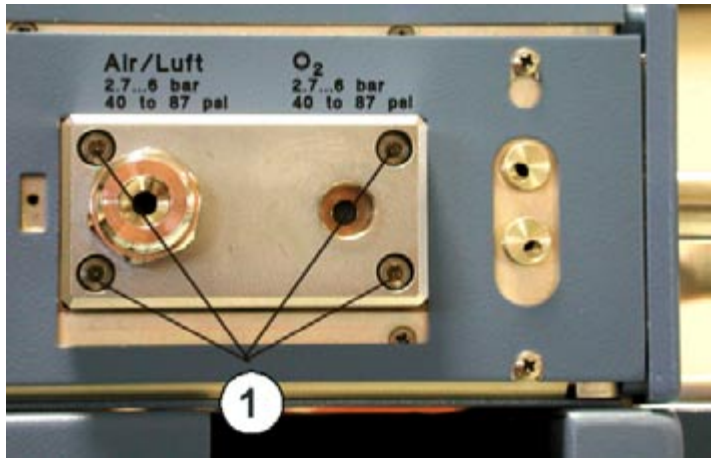

Fig. 5 Rear view of the machine, connector plate

11 Carry out a leak test on the Dräger gas connection block.

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1.2 Removing the Dräger gas connection block

Prerequisite for the removal of the Dräger gas connection block

- The machine is open, see section 3 Folding the electronic assembly down

1 Remove the screws (Fig. 6 /1) from the rear panel.

2 Remove the rear panel and put it aside.

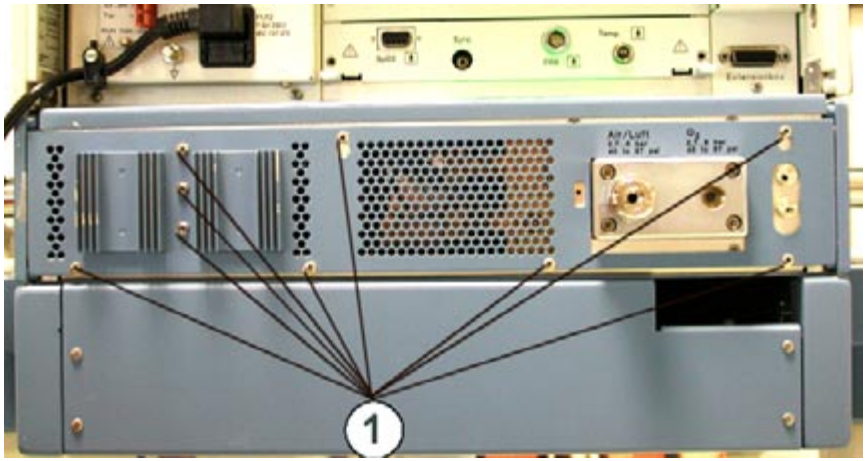

Fig. 6 Rear view of the machine, rear panel

3 Remove the screws (Fig. 7/1) and put the connector plate aside.

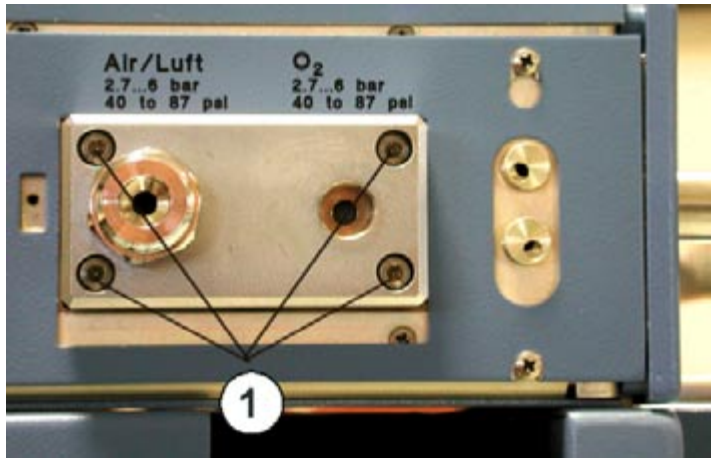

Fig. 7 Connector plate

4 Remove the screws (Fig. 8/1).

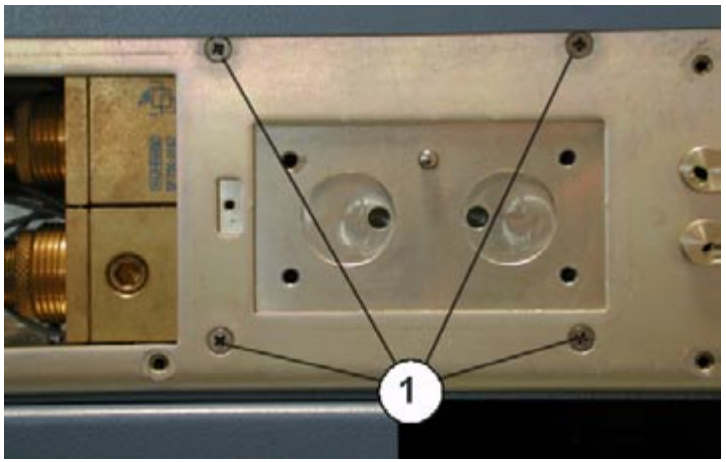

Fig. 8 Dräger gas connection block

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1.3 Replacing the pressure regulators

Prerequisite for the replacement of the Dräger pressure regulators:

- The machine is open, see section 3 Folding the electronic assembly down
- Removing the Dräger gas connection block, see section 1.2 Removing the Dräger gas connection block

1 Place the Dräger gas connection block (Fig. 9) in an upright position.

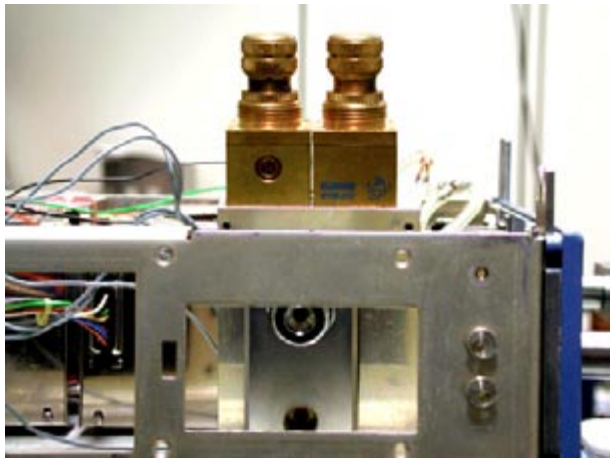

Fig. 9 View of the pneumatic assembly (cover removed)

2 Remove the screws (Fig. 10/1).

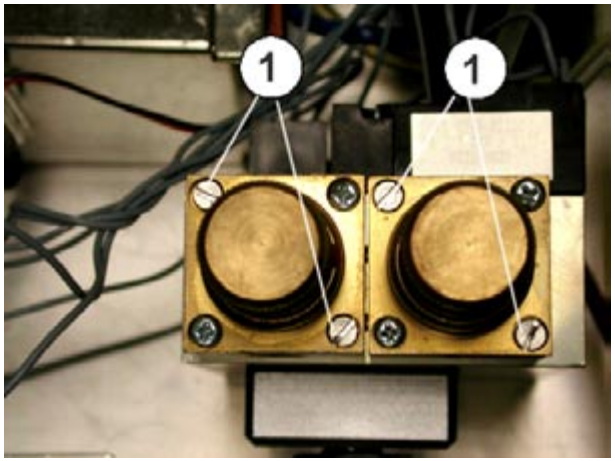

Fig. 10 Top view of the pressure regulators

3 Dispose of the two old pressure regulators and the four old O-rings according to local waste disposal regulations.

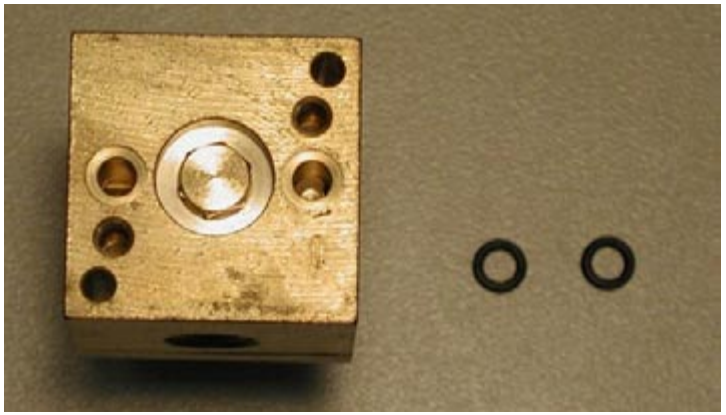

Fig. 11 Pressure regulator with O-rings removed

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4 Loosen the lock nuts (Fig. 12/1) of the new pressure regulators, and turn the adjusting screws approx. three turns counter-clockwise in order to close the pressure regulators.

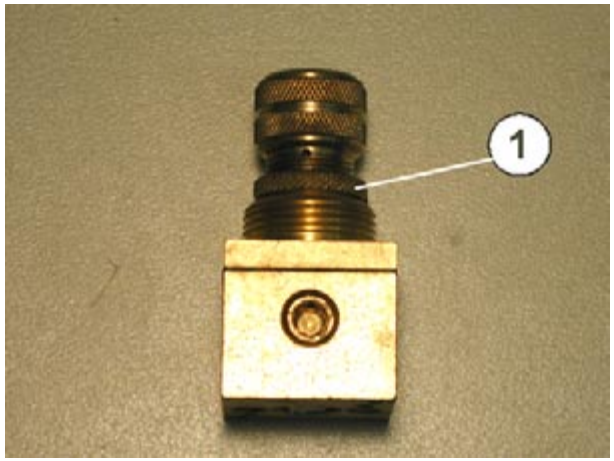

Fig. 12 Pressure regulator with lock nut

5 Place the O-rings in the recesses of the two new pressure regulators.

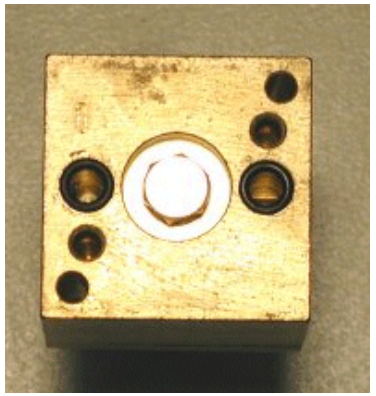

Fig. 13 Pressure regulator with O-rings

⚠ An incorrectly fitted pressure regulator (mixed up inlet and outlet) will damage the machine. The code (arrow or number) on the underside of the pressure regulator and on the Dräger gas connection block indicate the inlets. The inlets must be aligned (on top of each other) upon assembly.

6 Place the pressure regulators on the Dräger gas connection block, making sure the codes of the new pressure regulators are aligned correctly (arrow on arrow or number on number, see Fig. 14/1).

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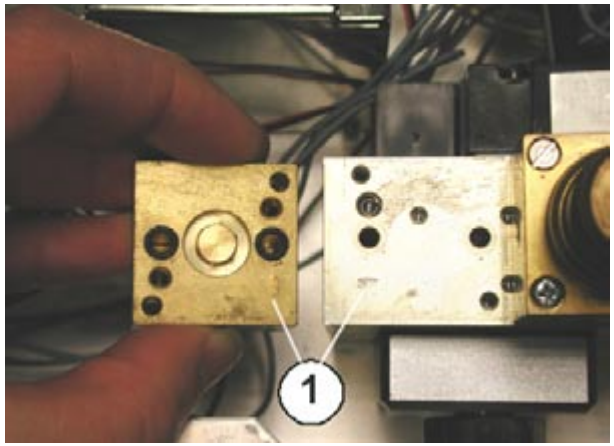

Fig. 14 Number codes on the pressure regulators

7 Secure the pressure regulators to the Dräger gas connection block using the screws (Fig. 15/1).

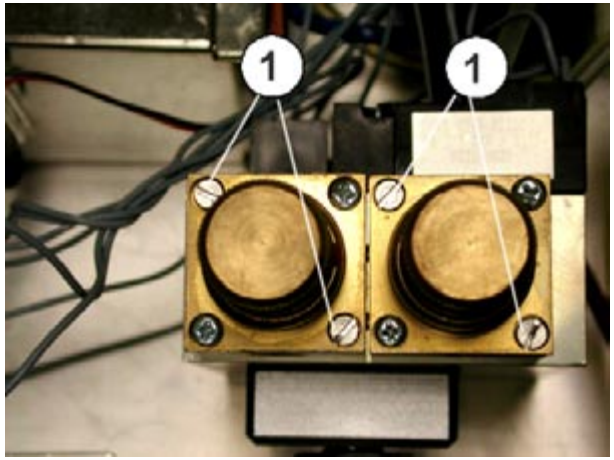

Fig. 15 Top view of the pressure regulators

To the item:

- For adjustment of the pressure regulators, see section 1.4 Adjusting the pressure regulators

1.4 Adjusting the pressure regulators

Prerequisite for the adjustment of the Dräger pressure regulators:

- The machine is open, see section 3 Folding the electronic assembly down
- the Dräger gas connection block has been removed, see section 1.2 Removing the Dräger gas connection block

1 Place the Dräger gas connection block (Fig. 16) in an upright position.

2 Loosen the lock nuts (Fig. 16/1) of the adjusting screws.

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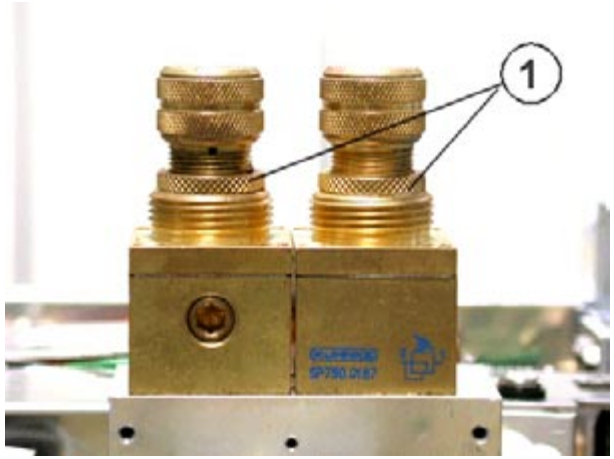

Fig. 16 Dräger gas connection block, lock nuts

3 First close both pressure regulators (Note: Turn adjusting screws counter-clockwise until you can feel a resistance).

4 Connect the machine to the “AIR“ supply.

5 Plug the power plug of the machine into the socket-outlet.

6 Switch on the machine.

7 Adjust the following parameters:

- Operating mode “IPPV“
- f = 6 min-1
- VT = 16 L/min

8 Connect a pressure gauge (measuring range up to 6 bar) to the nebulizer outlet of the machine.

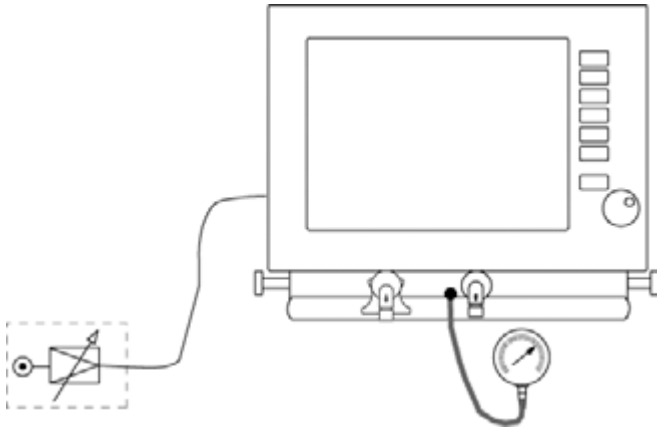

Fig. 17 Test set-up

9 Switch on the drug nebulizer.

10 Turn the adjusting screw (Fig. 18/1) clockwise, and set the pressure on the “AIR“ pressure regulator to 2 bar (tolerance: 1.9 bar to 2.1 bar) (Note: read the set pressure on the external pressure gauge).

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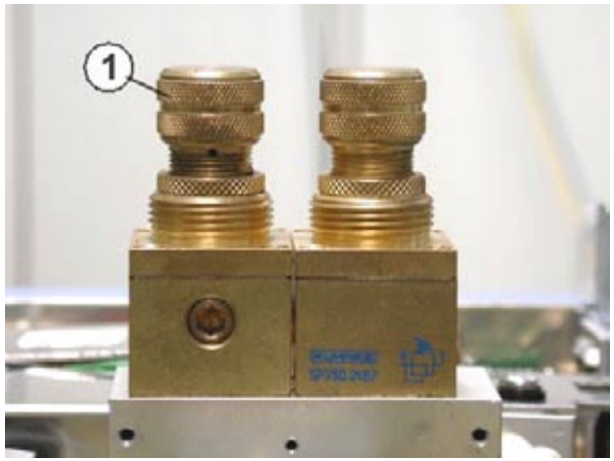

Fig. 18 Pressure regulator (AIR)

11 After the adjustment, secure the adjusting screw of the “AIR“ pressure regulator with the lock nut.

12 Switch off the drug nebulizer.

13 Disconnect the “AIR“ compressed-gas hose from the compressed-gas supply.

14 Disconnect the hose of the external pressure gauge from the drug nebulizer connector (venting).

15 Connect the hose of the external pressure gauge to the drug nebulizer connector.

16 Connect the machine to the “O2“ supply.

17 Switch on the drug nebulizer.

18 Turn the adjusting screw (Fig. 19/1) clockwise, and set the pressure on the “O2“ pressure regulator to 2 bar (tolerance: 1.9 bar to 2.1 bar) (Note: read the set pressure on the external pressure gauge).

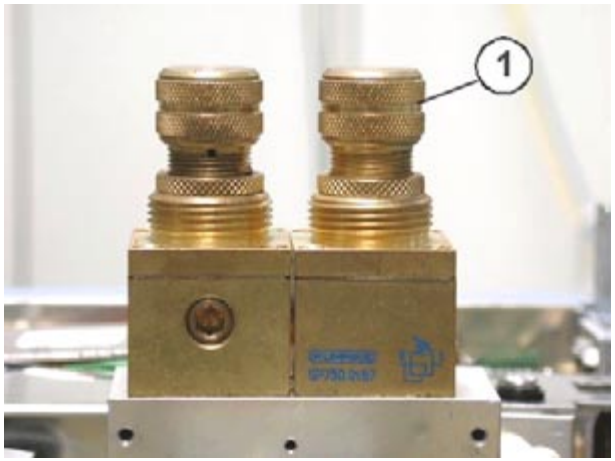

Fig. 19 Pressure regulator (O2)

19 After the adjustment, secure the adjusting screw of the “O2“ pressure regulator with the lock nut.

20 Switch off the drug nebulizer.

21 Place the Dräger gas connection block into its mounting position.

22 Secure the lock nuts of the two pressure regulators with Loctite 221 to protect them from becoming loose, see Fig. 20.

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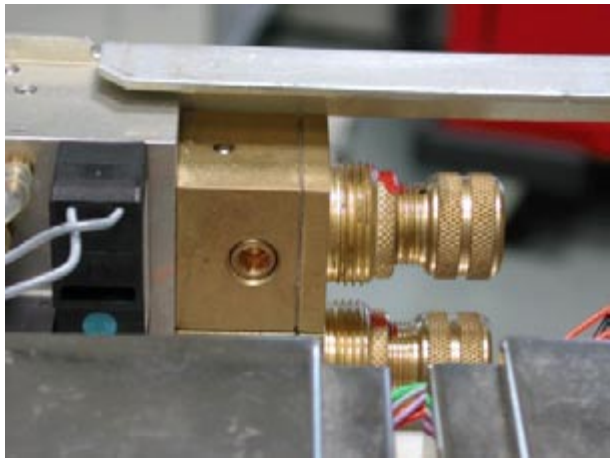

Fig. 20 Pressure regulator, Loctite

To the item:

- Fitting the Dräger gas connection block, see 1.5 Fitting the Dräger gas connection block

1.5 Fitting the Dräger gas connection block

1 Secure the Dräger gas connection block to the machine using the screws (Fig. 21/1).

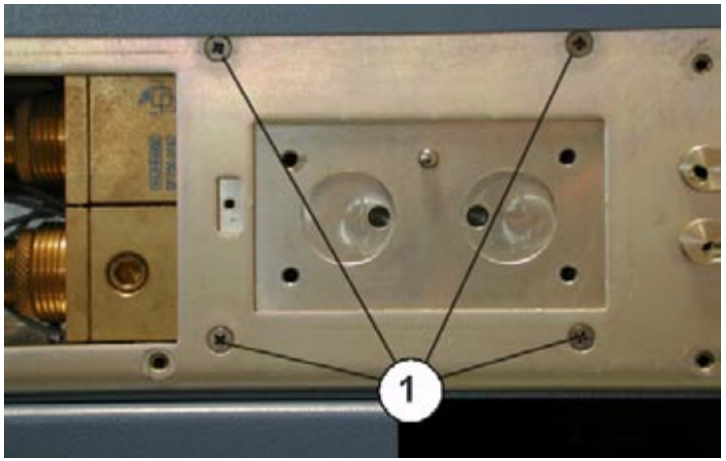

Fig. 21 Fitting the Dräger gas connection block

2 Secure the connector plate to the Dräger gas connection block using the screws (Fig. 22/1).

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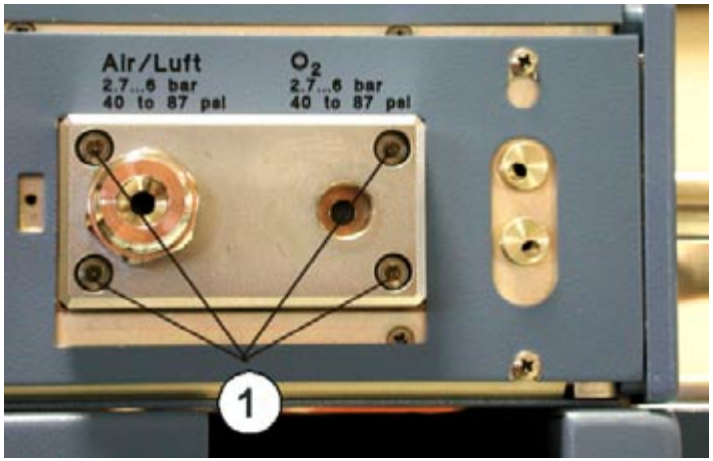

Fig. 22 Connector plate

3 Secure the rear panel to the machine using the screws (Fig. 23/1).

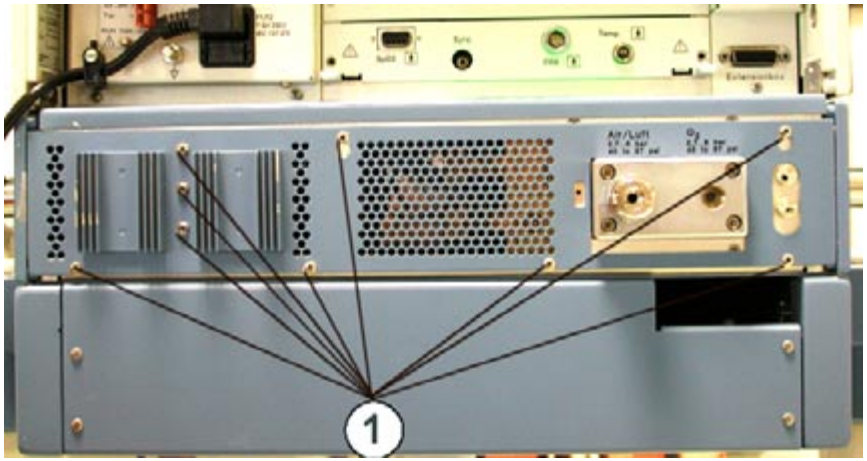

Fig. 23 Rear view of the machine, rear panel

To the item:

- Closing the machine, see section 4 Folding down the electronic unit assembly

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2 FAS gas connection block

The connector plate of the FAS gas connection block is secured to the back of the machine by two screws (Allen screws, SW3).

To the items:

- Replacing the filters, see 2.1 Replacing the filters
- Removing the FAS gas connection block, see 2.2 Removing the FAS gas connection block
- Replacing diaphragms and valve tappets, see 2.3 Replacing diaphragms and valve tappets
- Adjusting the FAS pressure regulators, see 2.4 Adjusting the FAS pressure regulators
- Fitting the FAS gas connection block, see 2.5 Fitting the FAS gas connection block to the machine

2.1 Replacing the filters

1 Switch off the machine.

2 Unplug the power plug of the machine from the socket-outlet.

3 Disconnect the compressed-gas connectors of the machine from the compressed-gas supply.

4 Unscrew the compressed-gas hoses from the machine.

5 Remove screws and washers (Fig. 24/1) on the connector plate and remove the connector plate.

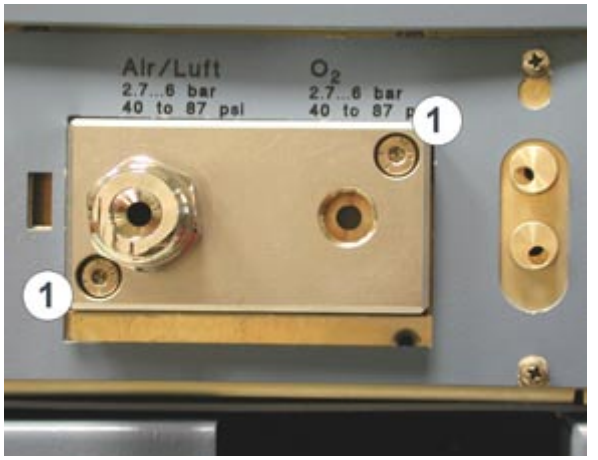

Fig. 24 Rear view of the machine, FAS gas connection block

6 Remove the washers (Fig. 25/1) and put them aside.

Fig. 25 Connector plate, washers

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7 Remove old O-rings (Fig. 26/1) and dispose of them according to local waste disposal regulations.

Fig. 26 Connector plate, O-rings

8 Remove the filters (Fig. 27/1) from the connector plate and dispose of according to local waste disposal regulations.

9 Fit new filters (Fig. 27/1) into the connector plate, making sure the position is correct (Note: The fine filter points towards the compressed-gas connection side).

Fig. 27 Connector plate, filters

10 Fit new O-rings into the filters on the connector plate (Fig. 28/1)

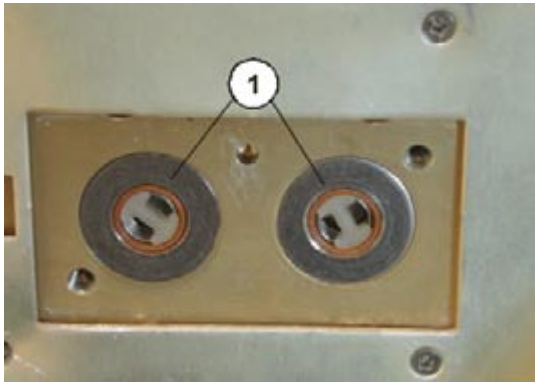

Fig. 28 Washers in the FAS gas connection block

11 Secure the connector plate to the FAS gas connection block using the screws (Fig. 29/1).

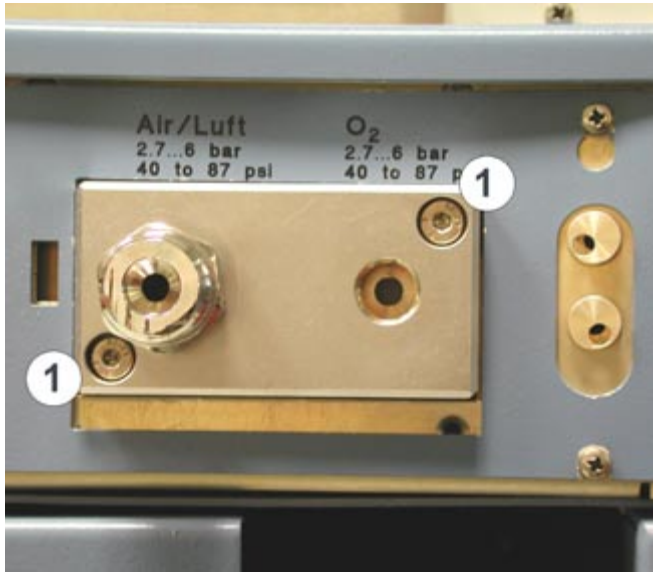

Fig. 29 Fitting the FAS gas connection block

12 Perform a leak test on the FAS gas connection block.

2.2 Removing the FAS gas connection block

Prerequisite for the removal of the FAS gas connection block:

- The machine is open, see section 3 Folding the electronic assembly down

1 Remove the screws (Fig. 30 /1) from the rear panel.

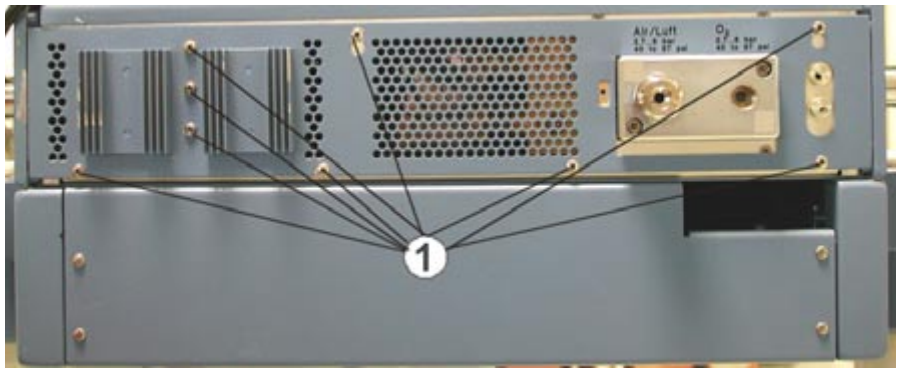

Fig. 30 Rear view of the machine, rear panel

2 Remove the rear panel and put it aside.

3 Remove the screws (Fig. 31/1) and put the connector plate aside.

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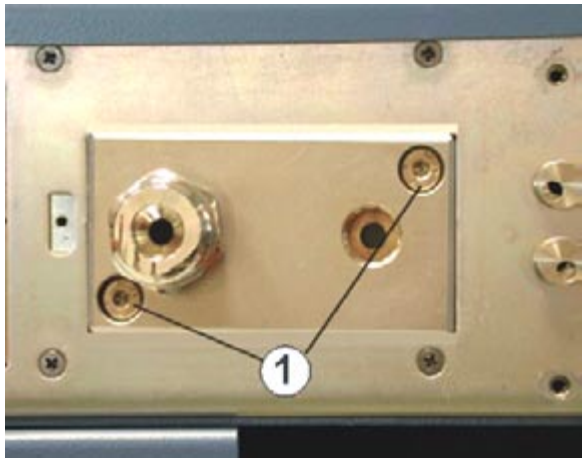

Fig. 31 Connector plate

4 Remove the screws (Fig. 32/1).

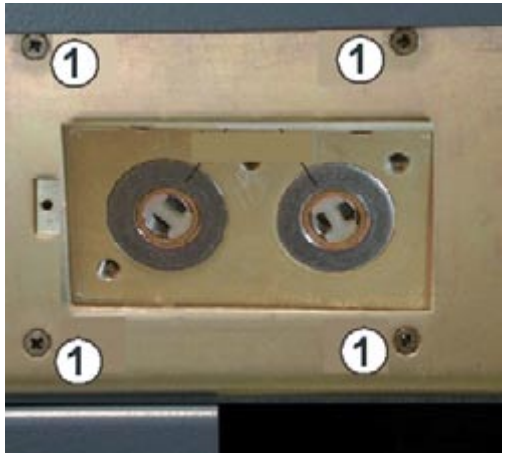

Fig. 32 Rear view of the machine, FAS gas connection block

To the items:

2.3 Replacing diaphragms and valve tappets

2.4 Adjusting the FAS pressure regulators

2.3 Replacing diaphragms and valve tappets

Prerequisite for the adjustment of the FAS pressure regulators:

- The machine is open, see section 3 Folding the electronic assembly down
- Removing the FAS gas connection block, see section 2.2 Removing the FAS gas connection block

1 Lift and remove the FAS gas connection block, and put it aside.

2 Remove screws and washers (Fig. 33/1 and 2).

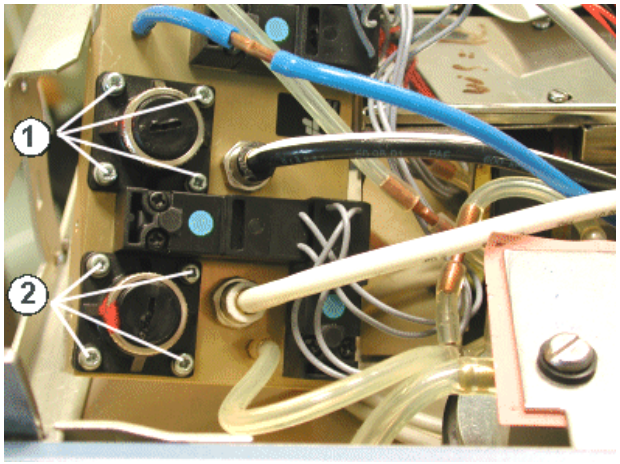

Fig. 33 Top view of the FAS gas connection block

3 Remove the housings of the pressure regulators and remove the springs, and put them aside.

4 Remove old diaphragms (Fig. 34/1 and 2) and dispose of them according to local waste disposal regulations.

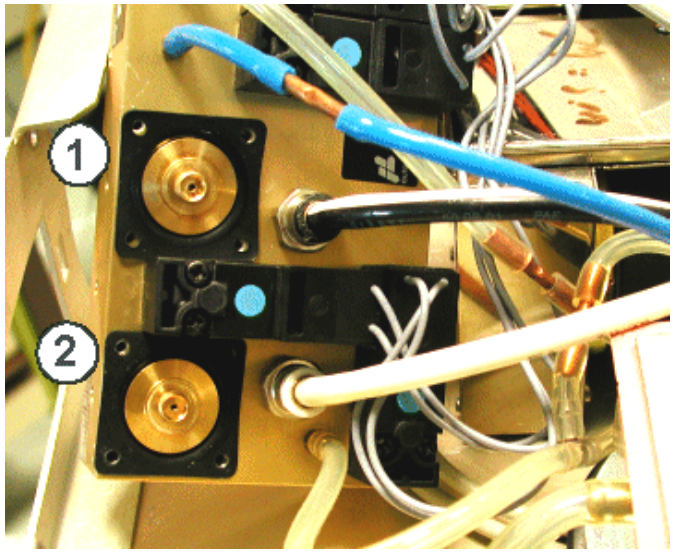

Fig. 34 FAS gas connection block, diaphragms

5 Turn the FAS gas connection block over.

6 Remove screws and washers, springs, and valve tappets (Fig. 35/1 and 2).

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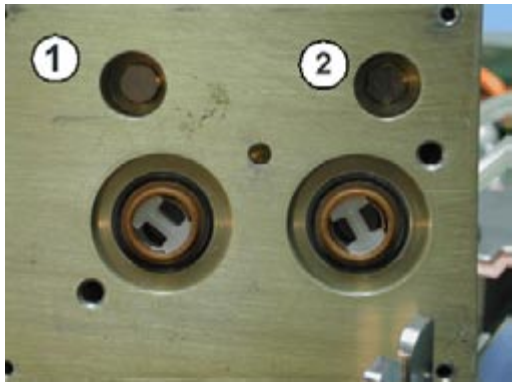

Fig. 35 Rear view of the FAS gas connection block

7 Remove the two old valve tappets (Fig. 36/1) and dispose of them according to local waste disposal regulations.

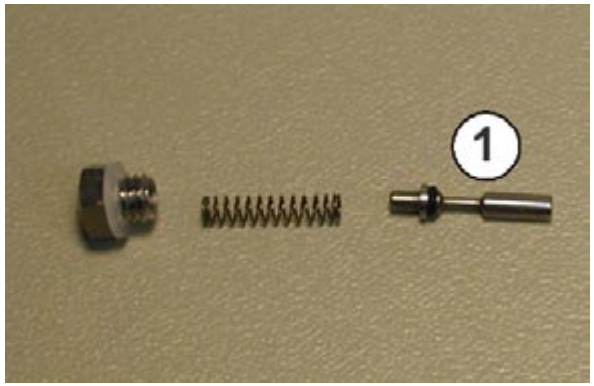

Fig. 36 Screw, sealing washer, spring, and valve tappet

8 Fit new valve tappets (Fig. 36/1) including springs, sealing washers and screws into the FAS gas connection block such that the sealing washer is flat against the FAS gas connection block, then tighten by another 90° to 110°.

9 Turn the FAS gas connection block over.

10 Unscrew the lock nuts (Fig. 37/1) and adjusting screws (Fig. 37/2) of the two housings (“AIR“ and “O2“) (Fig. 37/3).

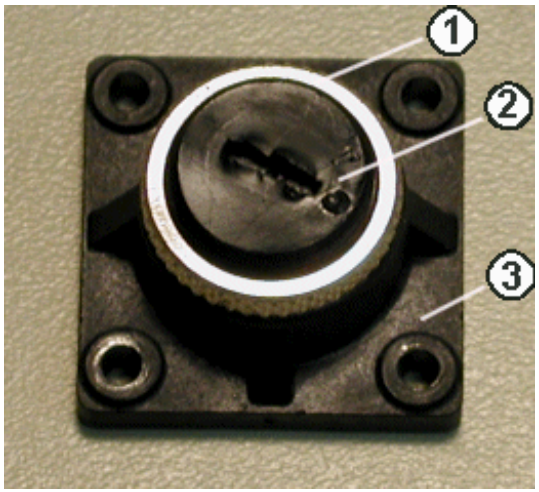

Fig. 37 Pressure regulator housing

11 Remove residual stop varnish from the two housings (“AIR“ and “O2“), from the two setting screws, and from the two lock nuts using a small brush or similar tool.

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Fig. 38 Dismounted housing of a FAS pressure regulator

12 Screw both adjusting screws (Fig. 37/2) two turns into the housing of the pressure regulators (“AIR“ and “O2“).

13 Screw the lock nuts (Fig. 37/1) two turns onto the adjusting screws.

14 Place the new diaphragms (Fig. 39/1 and 2) (with the elevated part of the diaphragm plate pointing up) onto the FAS gas connection block.

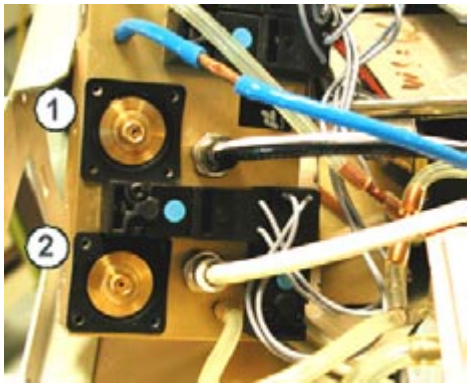

Fig. 39 FAS gas connection block, diaphragms

15 Place the springs into the housings of the two pressure regulators (“AIR“ and “O2“), and secure the housings to the FAS gas connection block by hand-tightening the screws (Fig. 40/1 and 2) crosswise.

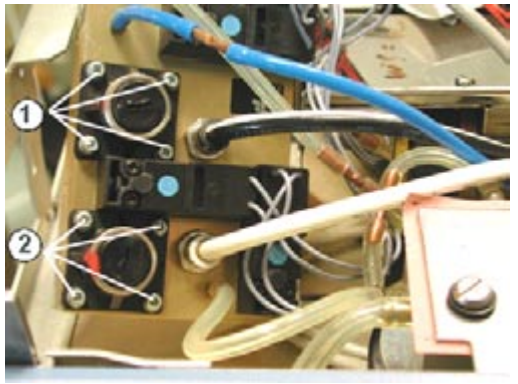

Fig. 40 Fitting the FAS gas connection block

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To the items:

2.4 Adjusting the FAS pressure regulators

2.4 Adjusting the FAS pressure regulators

Prerequisite for the adjustment of the FAS pressure regulators:

- The machine is open, see section
- Removing the FAS gas connection block, see section

1 Turn the lock nuts (Fig. 41/1) approx. two turns counter-clockwise.

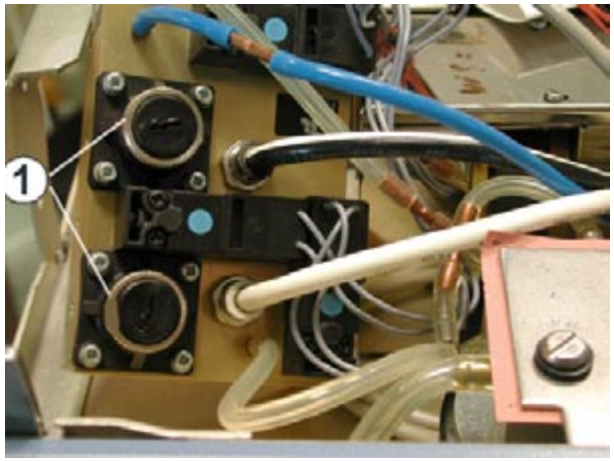

Fig. 41 Top view of the FAS gas connection block

2 First close the pressure regulators (Note: Turn adjusting screw counter-clockwise until you can feel a resistance).

3 Connect the machine to the “AIR“ supply.

4 Plug the power plug of the machine into the socket-outlet.

5 Switch on the machine.

6 Adjust the following parameters:

- Operating mode “IPPV“
- f = 6 min-1
- VT = 16 L/min

7 Connect a pressure gauge (measuring range up to 6 bar) to the nebulizer outlet of the machine, see Fig. 42.

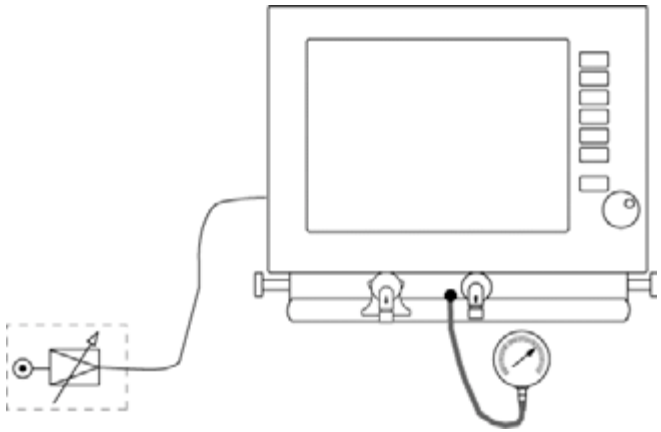

Fig. 42 Test set-up

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8 Switch on the drug nebulizer.

9 Turn the adjusting screw (Fig. 43/1) clockwise, and set the pressure on the “AIR“ pressure regulator to 2 bar (tolerance: 1.9 bar to 2.1 bar) (Note: read the set pressure on the external pressure gauge).

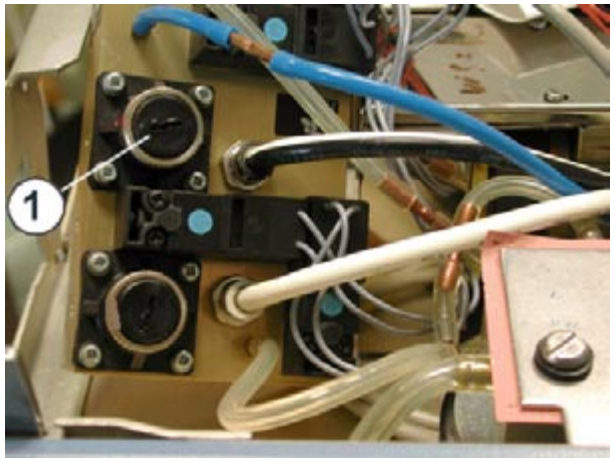

Fig. 43 Adjusting screw (AIR)

10 After the adjustment, secure the adjusting screw of the “AIR“ pressure regulator with the lock nut.

11 Using Loctite 221, secure the lock nut of the “AIR“ pressure regulator at the transition points between the lock nut and the housing of the pressure regulator and the lock nut and the adjusting screw, see Fig. 44.

Fig. 44 Pressure regulator, Loctite

12 Switch off the drug nebulizer.

13 Disconnect the “AIR“ compressed-gas hose from the compressed-gas supply.

14 Disconnect the hose of the external pressure gauge from the drug nebulizer connector (venting).

15 Connect the hose of the external pressure gauge to the drug nebulizer connector.

16 Connect the machine to the “O2“ supply.

17 Switch on the drug nebulizer.

18 Turn the adjusting screw (Fig. 45/1) clockwise, and set the pressure on the “O2“ pressure regulator to 2 bar (tolerance: 1.9 bar to 2.1 bar) (Note: read the set pressure on the external pressure gauge).

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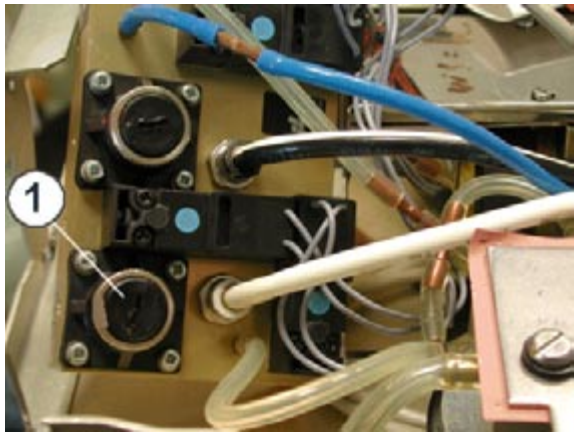

Fig. 45 Adjusting screw (O2)

19 After the adjustment, secure the adjusting screw of the “O2“ pressure regulator with the lock nut.

20 Using Loctite 221, secure the lock nut of the “O2“ pressure regulator at the transition points between the lock nut and the housing of the pressure regulator and the lock nut and the adjusting screw, see Fig. 46.

Fig. 46 Pressure regulator, Loctite

21 Switch off the drug nebulizer.

22 Disconnect the “O2“ compressed-gas hose from the compressed-gas supply.

To the item:

Fitting the FAS gas connection block to the machine

2.5 Fitting the FAS gas connection block to the machine

1 Place the FAS gas connection block into its mounting position.

2 Secure the FAS gas connection block to the machine using the screws (Fig. 47/1).

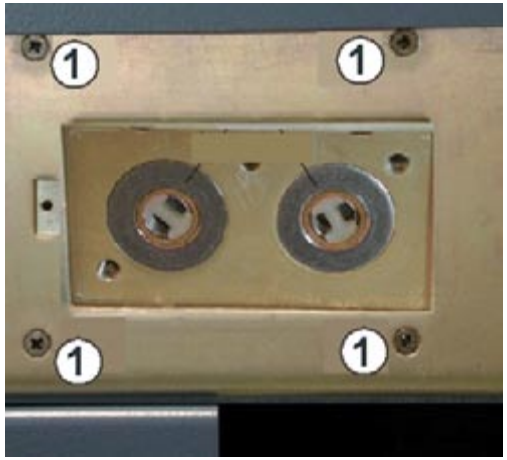

Fig. 47 Rear view of the machine, FAS gas connection block

3 Secure the connector plate to the FAS gas connection block using the screws (Fig. 48/1).

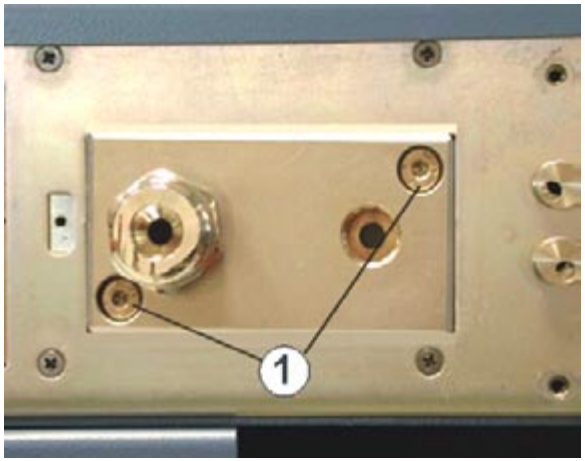

Fig. 48 Connector plate

4 Secure the rear panel to the machine using the screws (Fig. 49/1).

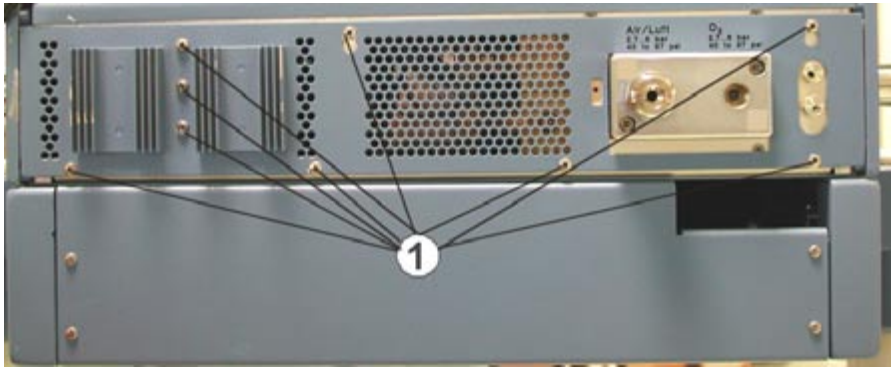

Fig. 49 Rear view of the machine, rear panel

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To the item:

4 Folding down the electronic unit assembly

3 Folding the electronic assembly down

1 Switch off the machine.

2 Unplug the power plug of the machine from the socket-outlet.

3 Disconnect the compressed-gas connectors of the machine from the compressed-gas supply.

4 Unscrew the compressed-gas hoses from the machine.

Electrostatic discharge may damage the electronic components. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

5 Create ESD conditions.

6 Remove the screw (Fig. 50/1).

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Fig. 50 Left side view of the machine, screw

7 Remove the screw (Fig. 51/1) from the fixing plate.

Fig. 51 Rear view of the machine, screw

8 Fold the electronic assembly slowly up secure it in place using the locking mechanism (Fig. 52/1).

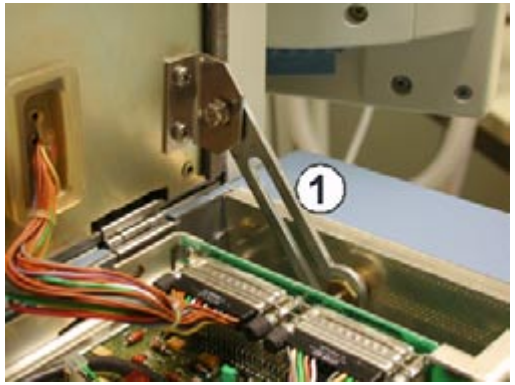

Fig. 52 Machine (open), locking mechanism

To the items:

Dräger gas connection block

Replacing the pressure regulators

Adjusting the pressure regulators

FAS gas connection block

Replacing diaphragms and valve tappets

Adjusting the FAS pressure regulators

4 Folding down the electronic unit assembly

1 Switch off the machine.

2 Unplug the power plug of the machine from the socket-outlet.

3 Unlock the locking mechanism (Fig. 53/1) and fold the electronic assembly slowly down.

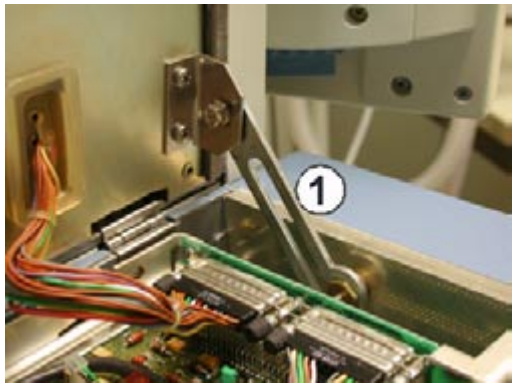

Fig. 53 Machine (open), locking mechanism

4 Secure the electronic assembly to the pneumatic assembly using the screw (Fig. 54/1).

Fig. 54 Left side view of the machine, screw

5 Secure the electronic assembly to the fixing plate using the screw (Fig. 55/1).

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Fig. 55 Rear view of the machine, screw

6 Assemble the machine ready for use.

7 Check the electrical safety, the gas tightness, and the correct functioning of the machine as per PMS procedure (Test Certificate).